REMARKS

Claims 1-91 are pending in the application. Claims 1, 27 32-37, 39, 40, 42, 43, 47, 51, 70-83, 86 and 87 are currently amended , Claim 91 is new.

I. New Claims

Claim 91 has been added to more fully claim the subject matter as disclosed in the specification.

II. Claim Rejections Under 35 U.S.C. 101

Claims 1-90 stand rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Applicant respectfully traverses.

Independent claims 1, 27, 51, and 70 have been amended to clarify that the invention relates to machines, and methods of constructing machines, which utilize a neural net architecture to implement fractal computation, as it is defined in the claims and the body of the specification.

The architecture so described is not an algorithm, but rather a group of computational nodes, which are tangible objects, which arranged with a series of physical interconnections such that a new machine is created that is capable of fractal computation. In the broadest context, this new machine may be analogized to, for example, an Arithmetic Logic Unit (ALU) or similar circuit whose principle function is the manipulation of data using a variety of mathematical techniques.

There appears to be little controversy that an ALU may be patentable . Indeed, patents for ALUs continue to issue on a regular basis. In light of current case law, one may ask exactly what is patentable about such devices? Such devices input data as signals, manipulate data as signals, and output data as signals, yet, In re Nuijten, 500 F.3d 1346 (Fed. Cir. 2007), tells us that signals are not patentable subject matter. Such devices manipulate data using well known algorithms, yet In re Warmerdam, 3 F.3d 1354 (Fed. Cir. 1994), among others, make clear that algorithms, per se, are not patentable.

The answer is simple, such ALUs are machines whose architecture is novel, useful, and non-obvious, and thus patentable. It is the architecture the ALU embodied in silicon that enables the input and output of signals, that enables the manipulation of data according to well known algorithms. In this application, what is claimed are machines and methods of structuring machines, composed of networked computational nodes whose arrangement is novel, useful, and non-obvious.

No one would seriously question the utility of an ALU even if no specific use for the ALU is disclosed for in patent applications. The ALU itself is a general purpose computing device whose uses are well known. No one demands that a patent application for an ALU be limited to specific uses for a new type of ALU. The ALU is an end in and of itself. Similarly, in this application, the disclosed neural computing device is a general purpose computing device. The uses for neural computing devices are well known. The neural computing device disclosed in the present application is an end in and of itself.

Furthermore, the applicant has, in fact, disclosed a number of specific uses for the neural computing device described in this application including that of a language parser (FIG. 19), various forms of a file searcher (FIG. 20, 21, and 22), a natural language translator (FIG. 23), a smart scanner (FIG. 24 and 25), a natural language dialect parser (FIG. 26), a written language parser (FIG. 27 and 28), and a natural language processor (FIG. 23.) Nevertheless, these specific uses are exemplary and not intended to limit the uses of the disclosed neural computing device.

It is error to mechanically assume that since the disclosed device is claimed as a general purpose device whose input and output are numbers that it is nothing more than an algorithm disguised as a machine. By the same logic, any general purpose computing device, such an ALU or any other circuit or chip within a computing device whose function is principally the manipulation of signals or data using known process steps is also nothing more than an algorithm disguised as a machine.

Therefore Applicant respectfully requests that the rejections of Claims 1-90 under 35 U.S.C. 101 as being directed to non-statutory subject matter be withdrawn.

III. Claim Rejections Under 35 U.S.C. 112, First Paragraph

Claims 1-90 are rejected under 35 U.S.C. §112, first paragraph because current case law require such a rejection if a §101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application.

As argued above, Applicant has disclosed a useful, concrete, and tangible invention, a neural computing device whose architecture provides, *inter alia*, fractal computation capabilities. The written description of the invention, and of the manner and process of making and using it, is described in such full, clear, concise, and exact terms as to enable any person skilled in the art to make and use the same.

Therefore Applicant respectfully requests that the rejections of Claims 1-90 under 35 U.S.C. 112, First Paragraph be withdrawn.

IV. Claim Rejections Under 35 U.S.C. 102(b)

Claims 1-5 and 27-31 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Number 5,408,424 to Lo. Applicant respectfully traverses.

Independent claims 1 and 27 have been amended to more clearly distinguish Claim 1 and 27 and their dependant claims over Lo. Additionally, Applicant comments on Lo and its applicability to the present Application as follows.

Applicant notes initially that the term "implicit computation" is not equivalent to "supervised learning", as will be made clear below.

Examiner argues, Fig 6 of Lo anticipates the layered architecture of the present invention. FIG. 6 in Lo is "a typical multilayer perceptron with output feedbacks." Since perceptrons are, by definition, feedforward, Figure 6 is inconsistent with the definition of a perceptron. Moreover, neural networks all have layers, and most have feedback connections. They are distinguished by the computations performed within the architecture.

In Lo, the computations are weighted averages compared to a threshold, and learning is accomplished by means of "the group consisting of the conjugate gradient methods, the quasi-Newton methods, and the gradient descent methods." The present invention uses known connection methods to combine representations and transform them by a minimalization step, which is why it is referred to as "implicit". Figure 6 does not show that, it merely is an example of the various connections, layers and nodes that can be found in virtually any neural network patent. Lo himself said it was "typical".

As to "minimalization," the present invention requires that to be applied as the computation step given the data presented at a given node and the success criterion stated for that node. That places the computational requirement on specifying or evolving the connections and stating the success criteria so that they work at specific nodes, not general criteria for the whole network. Thus, where Lo uses minimization of a derivative in his claim 39, that is not the learning criterion, it is the measurement used by his invention to adjust the weights by a different weighting method (gradient descent, etc.). In the present invention, as stated in Claim 1, the lowest valued combinations that meet the criteria are selected, and the others are not. That means that the connections and criteria are critical, not the fairly simple minimalization step.

The Examiner argues Lo anticipates implicit computation because it does not involve mathematical models, formulas, equations, such as the Markov process. It applies to all signal processes, and thus, according to Examiner, to all supervised learning processes as well. Applicant respectfully disagrees. Lo made no such claim. Lo claimed a method for estimating a signal process defined as:

…a process is an ordered sequence of vector-valued variables with the same dimension…

The collection of all the processes whose values at each time are what it to be estimated is called a signal process. Lo attempts to provide such values using a recurrent neural network, and that is all that is claimed. Lo is, in fact, an application of commonly known neural network architectural ideas to solve a specific class of problems. The present invention does not require an ordered sequence of vector-valued variables with identical dimensions, although such inputs would be possible inputs.

Applicant notes that the Examiner appeared to imply that a definition of "local" is needed. For the present invention, "local" means that each computational node applies its computation based solely on the inputs it receives within a specified time window, using specified success criteria. That is, a node is only "aware" of what it "sees" at a given time. It does not "know" anything else about what is happening in the network.

The Court of Appeals for the Federal Circuit has consistently held that "Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim." Lindemann Maschinenfabirk Gmbh v. American Hoist & Derrick, 221 USPQ 481, 485 (Fed. Cir. 1984). As argued above, independent Claims 1 and 27 as amended contain elements neither disclosed or implied by Lo, therefore, Claims 1 and 27 and their dependant claims are not anticipated by Lo.

Therefore Applicant respectfully requests that the rejections of Claims 1-5 and 27-31 under 35 U.S.C. 102(b) as being anticipated by Lo be withdrawn.

V. Conclusion

Having responded to all objections and rejections set forth in the outstanding Office Action, it is submitted that Claims 1-11 and 14-17 are in condition for allowance and Notice to that effect is respectfully solicited. In the event that the Examiner is of the opinion that a brief telephone or personal interview will facilitate allowance of one or more of the above claims, the Examiner is courteously requested to contact applicant's undersigned representative.

The Commissioner is authorized to charge any additional fees associated with this filing, or credit any overpayment, to Deposit Account No. 50-0653. If an extension of time is required, this should be considered a petition therefor.

Respectfully submitted,

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